1. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = e^{x+3} + 3$$

A. $f^{-1}(7) \in [4.3, 4.7]$

B. $f^{-1}(7) \in [4.4, 5.9]$

C. $f^{-1}(7) \in [4.4, 5.9]$

D. $f^{-1}(7) \in [4.3, 4.7]$

E. $f^{-1}(7) \in [-2.8, -1.3]$

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2. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 3x^2 + 5x + 8 \text{ and } g(x) = \frac{2}{4x + 27}$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-9.5, -2.5]$

B. The domain is all Real numbers except $x = a$, where $a \in [-13.75, -4.75]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-2, 5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [3.33, 9.33]$ and $b \in [-3.2, -2.2]$

E. The domain is all Real numbers.

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3. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -10$ and choose the interval that $f^-1(-10)$ belongs to.

$$f(x) = \sqrt[3]{2x + 5}$$

A. $f^{-1}(-10) \in [-499.5, -496.5]$

B. $f^{-1}(-10) \in [501.1, 503.1]$

C. $f^{-1}(-10) \in [495.1, 500.2]$

D. $f^{-1}(-10) \in [-503.9, -500.4]$

E. The function is not invertible for all Real numbers.

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4. Determine whether the function below is 1-1.

$$f(x) = (5x - 35)^3$$

A. Yes, the function is 1-1.

B. No, because the range of the function is not $(-\infty, \infty)$.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because the domain of the function is not $(-\infty, \infty)$.

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5. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{3}{6x + 37} \text{ and } g(x) = x + 7$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-6.5, -2.5]$

B. The domain is all Real numbers except $x = a$, where $a \in [-6.17, -2.17]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0, 3]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-3.8, 1.2]$ and $b \in [4.33, 8.33]$

E. The domain is all Real numbers.

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6. Find the inverse of the function below. Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = \ln(x + 4) - 5$$

A. $f^{-1}(10) \in [142.41, 149.41]$

B. $f^{-1}(10) \in [396.43, 399.43]$

C. $f^{-1}(10) \in [3269012.37, 3269019.37]$

D. $f^{-1}(10) \in [1202597.28, 1202600.28]$

E. $f^{-1}(10) \in [3269019.37, 3269022.37]$

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7. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -2x^3 + x^2 + 2x \text{ and } g(x) = -x^3 - 2x^2 - 3x - 4$$

A. $(f \circ g)(-1) \in [13, 17]$

B. $(f \circ g)(-1) \in [-16, -6]$

C. $(f \circ g)(-1) \in [-8, -3]$

D. $(f \circ g)(-1) \in [5, 12]$

E. It is not possible to compose the two functions.

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8. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^-1(-15)$ belongs to.

$$f(x) = 3x^2 - 4$$

A. $f^{-1}(-15) \in [1.82, 1.95]$

B. $f^{-1}(-15) \in [6.9, 7.22]$

C. $f^{-1}(-15) \in [3.76, 4.2]$

D. $f^{-1}(-15) \in [2.22, 2.55]$

E. The function is not invertible for all Real numbers.

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9. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = 2x^3 - 2x^2 + 2x + 3 \text{ and } g(x) = x^3 + 2x^2 + 3x$$

A. $(f \circ g)(-1) \in [-18.39, -17.32]$

B. $(f \circ g)(-1) \in [-13.09, -12.75]$

C. $(f \circ g)(-1) \in [-25.46, -22.42]$

D. $(f \circ g)(-1) \in [-21.79, -18.43]$

E. It is not possible to compose the two functions.

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10. Determine whether the function below is 1-1.

$$f(x) = (3x + 21)^3$$

A. No, because the range of the function is not $(-\infty, \infty)$.

B. No, because there is a y-value that goes to 2 different x-values.

C. No, because there is an x-value that goes to 2 different y-values.

D. Yes, the function is 1-1.

E. No, because the domain of the function is not $(-\infty, \infty)$.
